

REMARKS

The claims currently pending in this application are Claims 1-30, with Claim 1 being the independent claim. Claim 1 has been amended. No new matter has been added.

In the Official Action dated April 10, 2003, Claims 1-6, 11, 16, 21, and 26 were objected to because of the informalities listed on page 3 of the Official Action. Claim 1 has been amended in accordance with the Examiner's suggestions. Favorable consideration is respectfully requested.

Claims 1-3 were rejected under 35 U.S.C. § 102(b) as being anticipated by GB 2156590 A (Witschi et al.). Claims 1, 4, 5, 21, and 26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,329,737 B1 (Jerman, et al.) in view of Witschi, et al. Claims 6, 11, and 16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Witschi, et al. in view of Jerman, et al. Reconsideration and withdrawal of these rejections are respectfully requested in view of the above amendments and the following remarks.

The present invention as recited in independent Claim 1 relates to an electromagnetic actuator comprising a core with a coil wound around the core, two stators magnetically coupled to each end of the core; a movable element that can be displaced relative to the stator; and a supporting means for supporting the movable element. The stator and the movable element each have a projection and a depression parallel to the displacement direction of the movable element and are placed in such a way that the projection and depression of the stator engage with the projection and depression of the movable element.

The Witschi, et al. patent relates to a method of reducing the dependence of the air gap energy on gap length in a magnetic circuit. However, Witschi, et al. fails to disclose or

suggest the above-referenced features of the present invention. In particular, Witschi, et al. fails to disclose or suggest a stator and movable element that each have a projection and a depression parallel to the displacement direction of the movable element, and are placed in such a way that the projection and depression of the stator engage with the projection and depression of the movable object, as disclosed and claimed in the present invention.

The invention disclosed in Witschi, et al. comprises opposite faces of projection and depression which are slant from the moving direction. In contrast, the parallel constitution of the present invention enables the magnetic force to become constant and not depend on any displacement. Additionally, such configuration enables easier control such that greater displacement can be accomplished.

The Jerman, et al. patent relates to an actuator utilizing electrostatic force. However, Jerman, et al. fails to disclose or suggest the above-referenced features of the present invention. In particular, Jerman, et al. fails to disclose or suggest a stator and movable element that each have a projection and a depression parallel to the displacement direction of the movable element, and are placed in such a way that the projection and depression of the stator engage with the projection and depression of the movable object, as disclosed and claimed in the present invention.

The invention disclosed in Jerman, et al. utilizes a phenomenon wherein an electrostatic force is generated when a voltage is applied between comb-tooth electrodes and a movable member which is supported by a spring.

In contrast, the present invention generates a magnetic attraction between the stator and the movable element which are opposite to one another. Accordingly, opposite

polarization (N-polar vs. S-polar) exists within the actuator. The pairs of poles constitute a pair of comb-shaped concave-convex structures and the concave-convex direction is parallel to the moving direction of the movable element.

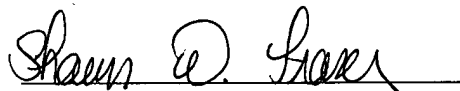
For the aforementioned reasons, Claim 1 is allowable over the cited art.

The dependent claims recite additional features that further distinguish the present invention from the cited art. Further individual consideration of the dependent claims is respectfully requested.

In view of the foregoing, Applicants submit that the application is in condition for allowance. Favorable consideration and withdrawal of the rejections set forth in the above-mentioned Official Action, and a notice of allowance are respectfully requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



Attorney for Applicants

Shawn W. Fraser

Registration No. 45,886

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200

SWF:eyw

DC-MAIN 141813 v1